Maniatis, M.; **Von Manteuffel, A.**; **Nachtmann, O.**

Determining the global minimum of Higgs potentials via Groebner bases - applied to the NMSSM. (English) Zbl 1191.81216

Eur. Phys. J. C, Part. Fields 49, No. 4, 1067-1076 (2007).

Summary: Determining the global minimum of Higgs potentials with several Higgs fields like the next-to-minimal supersymmetric extension of the standard model (NMSSM) is a non-trivial task already at the tree level. The global minimum of a Higgs potential can be found from the set of all its stationary points defined by a multivariate polynomial system of equations. We introduce here the algebraic Groebner basis approach to solve this system of equations. We apply the method to the NMSSM with CP-conserving as well as CP-violating parameters. The results reveal an interesting stationary-point structure of the potential. Requiring the global minimum to give the electroweak symmetry breaking observed in Nature excludes large parts of the parameter space.

MSC:

81V17 Gravitational interaction in quantum theory
13P10 Gröbner bases; other bases for ideals and modules (e.g., Janet and border bases)

Keywords:

Hoggs potential; Gröbner bases

Software:

FGb; NMHDECAY; SINGULAR

Full Text: DOI

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